

## 1 WHAT IS CLAIMED IS:

1. A rotary concrete mixing drum comprising:  
2 an interior surface at least partially provided by a polymer impregnated with  
3 a slip agent.
- 1 2. The drum of Claim 1 wherein the polymeric includes polyurethane.
- 1 3. The drum of Claim 1 wherein the slip agent has a surface energy less than  
2 the surface tension of a Portland Cement low slump concrete.
- 1 4. The drum of Claim 1 wherein the slip agent has a surface energy of less  
2 about 20 dynes per centimeter.
- 1 5. The drum of Claim 1 wherein the slip agent is a polydecene.
- 1 6. The drum of Claim 1 wherein the slip agent is a polyalpha olefin fluid.
- 1 7. The drum of Claim 1 wherein the slip agent is polytetrafluorethylene.
- 1 8. The drum of Claim 1 wherein the polymeric material is polyurethane,  
2 wherein the slip agent is polytetrafluorethylene and wherein at least 2% by weight of the  
3 impregnated polymer is polytetrafluorethylene.
- 1 9. The drum of Claim 8 wherein no greater than 5% by weight of the  
2 impregnated polymer along the surface is polytetrafluorethylene.
- 1 10. The drum of Claim 1 wherein the polytetrafluorethylene is about 2% by  
2 weight of the impregnated polymer along the surface.
- 1 11. The drum of Claim 1 wherein the polymer is polyurethane and wherein the  
2 slip agent is a polyalpha olefin.
- 1 12. The drum of Claim 11 wherein no greater than 5% of weight of the  
2 impregnated polymer is the polyalpha olefin.
- 1 13. The drum of Claim 12 wherein at least 2% by weight of the impregnated  
2 polymer is the polyalpha olefin.

1        14. The drum of Claim 11 wherein at least 2% by weight of the impregnated  
2 polymer is the polyalpha olefin.

1        15. The drum of Claim 11 wherein the polyalpha olefin comprises about 3% by  
2 weight of the impregnated polymer along the surface.

1        16. The drum of Claim 1 wherein the slip agent is configured so as to not  
2 substantially migrate within the polymer.

1        17. The drum of Claim 1 including:  
2                an inner layer including the impregnated polymer along the inner surface;  
3                and  
4                an outer layer providing an exterior surface of the drum.

1        18. The drum of Claim 17 wherein the outer layer is non-metallic.

1        19. The drum of Claim 18 wherein the outer layer includes fiberglass.

1        20. The drum of Claim 19 wherein the outer layer includes:  
2                fiberglass windings about the inner layer;  
3                a first layer of chopper fiberglass over the windings, the first layer having a  
4                ground surface with pores; and  
5                a second layer of chopper fiberglass over the first layer and across the pores.

1        21. The drum of Claim 20 wherein the first layer has a first thickness and  
2 wherein the second layer has a second lesser thickness.

1        22. The drum of Claim 20 wherein the first layer has a thickness of about 0.25  
2 inch and wherein the second layer has a thickness of about 0.05 inch.

1        23. The drum of Claim 20 wherein the second layer has a thickness of about 0.1  
2 inch.

1        24. The drum of Claim 20 wherein the ground surface has a smoothness from  
2 being ground by a 16 grit abrasive.

1        25. The drum of Claim 17 wherein the outer layer includes:

2 fiberglass windings about the inner layers;  
3 a sacrificial layer over the windings, wherein the sacrificial layer has a  
4 surface having pores; and  
5 a top layer over the sacrificial layer and across the pores.

26. The drum of Claim 17 wherein the outer layer is metallic.

1        27. The drum of Claim 1 wherein the impregnated polymer has a tensile strength  
2 of at least 15 MPa.

28. The drum of Claim 1 wherein the impregnated polymer has a Modulus 300% of at least 12 MPa.

1        29. The drum of Claim 1 wherein the impregnated polymer has a tear strength of  
2        at least 68 kN/m.

1        30. The drum of Claim 1 including inwardly extending projections configured to,  
2 move material as the drum is rotated, wherein the projections partially provide the interior  
3 surface of the drum.

31. The drum of Claim 30 wherein the projections have an exterior surface including the impregnated polymer.

32. The drum of Claim 31, wherein at least a portion of one of the projections has a thickness completely formed from the impregnated polymer.

33. A fin for use in a concrete mixing drum, the fin comprising:  
an exterior surface at least partially provided by a polymer impregnated with  
a slip agent.
34. A drum barrel for a concrete mixing drum, the barrel comprising:  
an interior surface at least partially provided by a polymer impregnated with  
a slip agent.
35. A method for forming a concrete mixing drum, the method comprising:  
impregnating a polymer with a slip agent; and  
forming an interior surface of a concrete mixing drum with the impregnated  
polymer.
36. The method of Claim 35 including molding the impregnated polymer.
37. The method of Claim 35 including spraying the impregnated polymer.
38. The method of Claim 35 wherein the slip agent includes  
polytetrafluorethylene.
39. The method of Claim 37 wherein impregnating includes mixing  
polytetrafluorethylene powder with a polyol.
40. The method of Claim 39 wherein mixing comprises high sheer mixing.
41. The method of Claim 40 wherein mixing is performed using a Cowles blade  
mixer.
42. The method of Claim 35 including:  
molding the impregnated polymer into a first section;  
forming an interior of the drum with the section; and  
applying fiberglass to an exterior of the first section.
43. The method of Claim 42 including:  
molding the impregnated polymer into a second section;  
coupling the second section to the first section to form the interior of the  
drum; and

5 applying fiberglass windings to an exterior of the second section.

1 44. The method of Claim 43 wherein the first section and the second section are  
2 helical and wherein coupling includes screwing the first section and the second section  
3 together.

1 45. The method of Claim 43 including:  
2 applying a sacrificial layer of fiberglass over the windings;  
3 grinding the sacrificial layer to form a ground exterior surface having pores;  
4 and  
5 applying a top layer of fiberglass over the ground exterior surface.

1 46. A method for finishing an exterior of a concrete mixing drum having a  
2 preliminary exterior surface, the method comprising:  
3 applying a sacrificial layer of fiberglass over the preliminary exterior  
4 surface;  
5 grinding the sacrificial layer to form a ground surface having pores; and  
6 applying a top layer on the ground surface over the pores.

1 47. The method of Claim 46 wherein the sacrificial layer is ground using an  
2 abrasive having at least a 16 grit.

1 48. The method of Claim 46 wherein the top layer is chopper fiberglass.

1 49. The method of Claim 48 wherein the top layer has a thickness of less than  
2 0.50 inches.

1        50. A concrete mixing truck comprising:  
2                a chassis;  
3                a cab supported by the chassis;  
4                a drum supported by the chassis and extending over the cab, the drum having  
5        the first section extending in an archimedial spiral along an axial center line of the drum;  
6        and  
7                a second section extending in an archimedial spiral along the axial center line  
8        of the drum, wherein the first section and the second section extend adjacent to one another.

1        51. A concrete mixing drum comprising:  
2                a barrel having an inner surface and an outer surface; and  
3                at least one projection spirally extending along the inner surface, wherein the  
4        inner surface is provided by a polymer and wherein the outer surface has a convex portion  
5        and a concave portion.

1        52. The drum of Claim 51 wherein the concave portion is located along an axial  
2        midsection of the drum.

1        53. The drum of Claim 51 wherein the convex portion and the concave portion  
2        are integrally formed as a single unitary body.

1        54. The drum of Claim 53 wherein the convex portion and the concave portion  
2        are formed from fiberglass windings.

1        55. The drum of Claim 51 wherein the inner surface is at least partially provided  
2        by a first archimedial section.

1        56. The drum of Claim 51 wherein the projections are integrally formed as a  
2        single unitary body with the inner surface of the barrel.

1        57. The drum of Claim 55 wherein the inner surface is provided by a second  
2        archimedial section screwed about the first section, wherein the first section and the second  
3        section each have an exterior mid-portion concave surface.

- 1        58. A rotary concrete mixing drum comprising an interior surface at partially
- 2        provided by a material including one of a slip agent or strength-durability agent
- 3        impregnated within the other of the slip agent or strength/durability agent.